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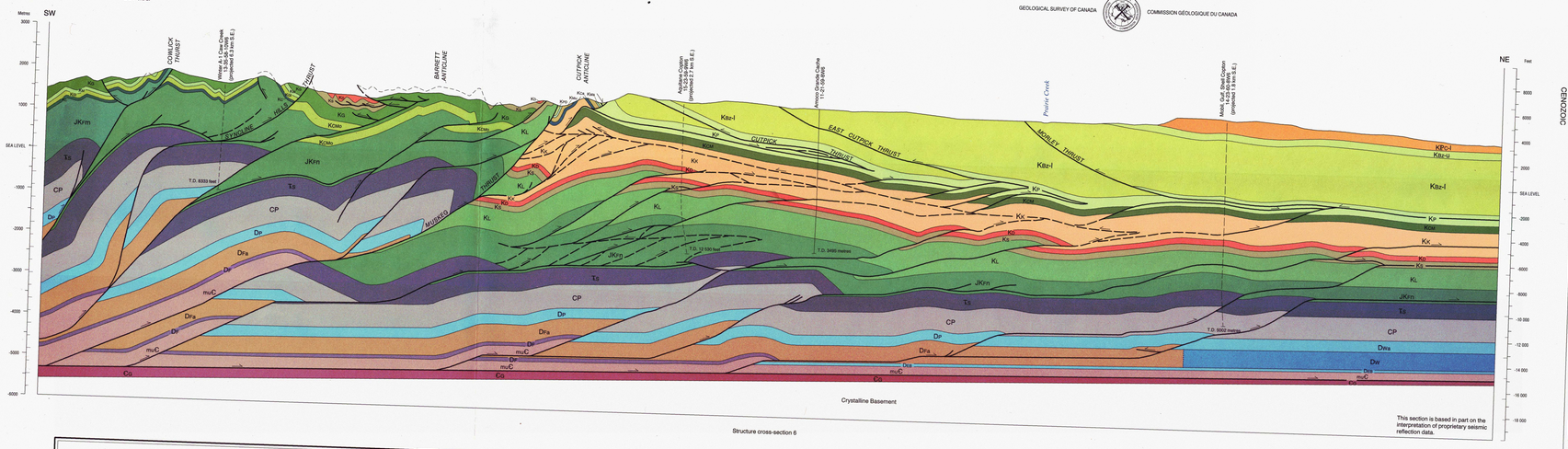
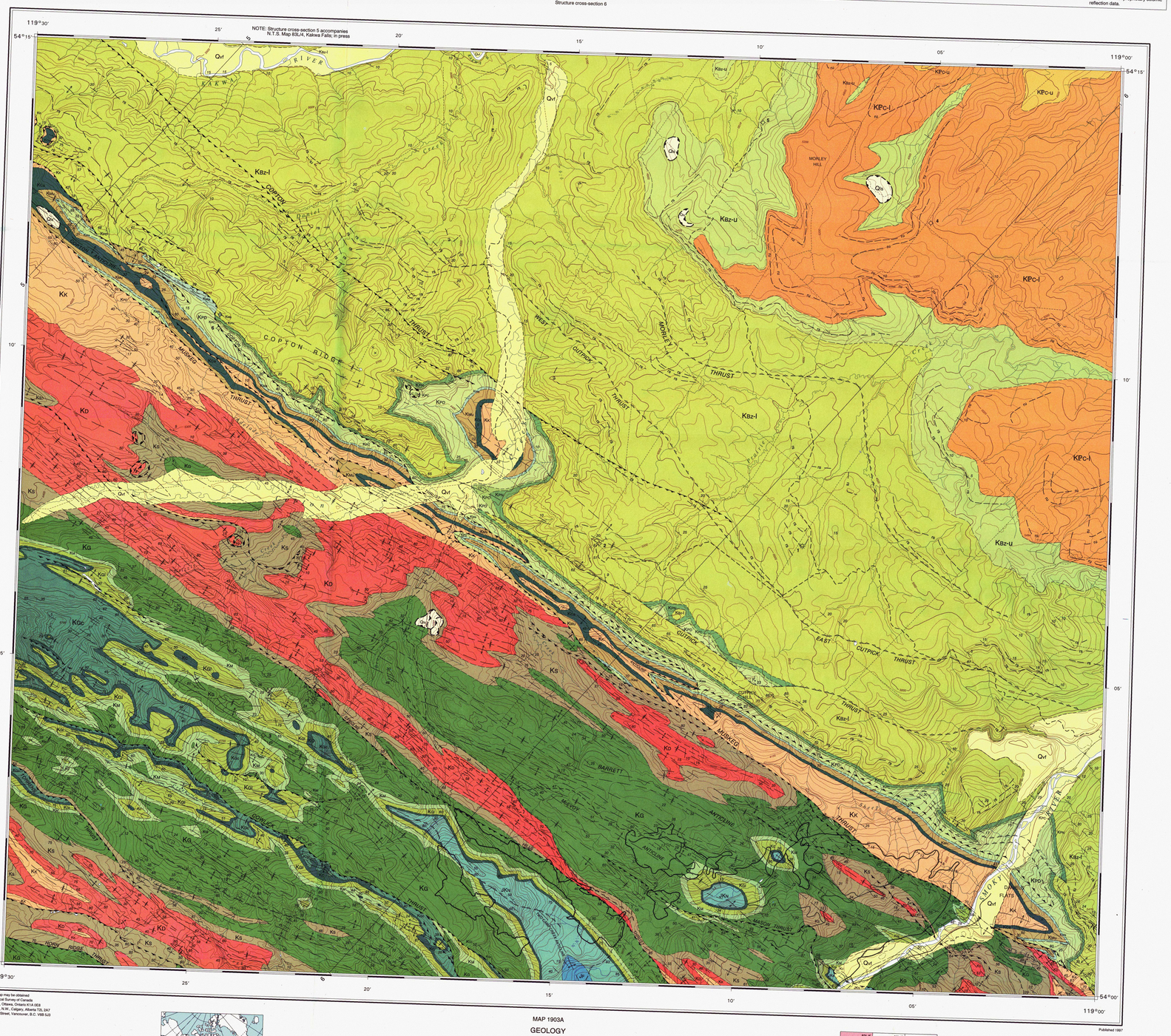
GEOLOGICAL SURVEY OF CANADA | COMMISSION GÉOLOGIQUE DU CANADA



Structure cross-section 6



Copies of this map may be obtained from the Geological Survey of Canada
601 Booth Street, Ottawa, Ontario K1A 0E8
3303-33rd Street, N.W., Calgary, Alberta T2L 2A7
101-605 Robson Street, Vancouver, B.C. V6B 5J3

Canada

MAP 1903A

GEOLOGY

COPTON CREEK

WEST OF SIXTH MERIDIAN

ALBERTA

Scale 1:50 000 - Échelle 1/50 000

Kilometres 0 1 2 3 4 Kilometres

Universal Transverse Mercator Projection
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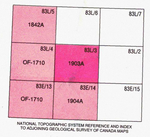


NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ACCOMPANY GEOLOGICAL SURVEY OF CANADA MAPS

Published 1997

LEGEND

CENOZOIC

QUATERNARY

PLEISTOCENE AND RECENT

Qls — *Landslide; blocks of nearby bedrock*

Qvf — *Alluvium, colluvium, till; gravel, sand, silt (shown only where bedrock is covered extensively)*

CRETACEOUS AND TERTIARY

UPPER CRETACEOUS AND PALEOCENE

WAPITI GROUP (Kbz-l - KPc-u)

COALSPUR FORMATION (KPc-l - KPc-u)

KPc-u — *Upper part: sandstone; light grey, fine grained, argillaceous, brownish weathering. Siltstone, mudstone; grey, greenish grey, carbonaceous, in fining upward cycles. Coal interbedded with thin beds of claystone. Base of local resistant units denoted by ru on map*

KPc-l — *Lower Part: sandstone; light grey, fine grained, argillaceous, commonly crossbedded, brownish weathering. Siltstone, mudstone; grey,greenish grey in fining upward cycles. Minor volcanic tuff, 25 to 30 m of light grey, fine- to coarse-grained, locally conglomeratic sandstone of the Entrance Member forms the base of the formation.*

CRETACEOUS

UPPER CRETACEOUS

BRAZEAU FORMATION (Kbz-l - Kbz-u)

Kbz-u — *Upper part: sandstone; light grey, fine grained, argillaceous, carbonaceous, commonly crossbedded, brownish weathering. Siltstone, mudstone; grey, greenish grey, carbonaceous; and coal. Relatively resistant, ribbed weathering unit; lower two thirds of unit includes Cutbank Coal Measures*

Kbz-l — *Lower part: sandstone; green, grey, fine to very coarse grained, argillaceous, carbonaceous, locally conglomeratic. Mudstone, siltstone; green, brown, grey, carbonaceous. Ribbed weathering unit. Base of local resistant units denoted by rs on map*

PUSKWASKAU FORMATION (KPo - Kpn)

Kpn — *Nomad Member: siltstone; medium grey, argillaceous; interbedded with shale; dark grey, rusty weathering. Relatively recessive weathering unit*

KPc — *Chungo Member: sandstone; grey, fine to medium grained, quartz and chert rich, laminated, well cemented, brown weathering. Resistant weathering unit*

KPd — *Dowling, Thistle and Hanson members: shale and calcareous shale; dark grey to black, commonly silty, grey to rusty weathering, sidertic concretions Recessive weathering unit*

Kp — *PUSKWASKAU FORMATION, undivided. Subsurface only*

Kma — *MARSHYBANK FORMATION: sandstone; grey, fine grained, quartz and chert rich, well cemented, brown weathering (lower part). Interbedded mudstone, siltstone, sandstone and minor coal (upper part). The lower part forms a resistant weathering unit*

Kmu — *MUSKIKI FORMATION: shale; dark grey, silty, rusty weathering with thin interbeds of grey argillaceous siltstone near the top. Recessive unit*

Kca — *CARDIUM FORMATION: sandstone; grey, fine grained, quartz and chert rich, well sorted and cemented, rusty brown weathering. Shale; grey, carbonaceous with argillaceous siltstone to coarse grained sandstone interbeds. Local chert-pebble conglomerate. Resistant marker unit*

KCm — *CARDIUM, MUSKIKI AND MARSHYBANK FORMATIONS, undivided. Subsurface only*

Kk — *KASKAPAU FORMATION: shale; dark grey to black, commonly silty, rusty weathering; with sidertic concretions and variable amounts of very thinly interbedded grey, brown weathering siltstone. Calcareous shale: dark grey, silver-grey weathering. Recessive, poorly exposed unit. Mesoscopic faults and folds are common*

Kd — *DUNVEGAN FORMATION: sandstone; grey, very fine to medium grained, argillaceous, brown weathering, micaceous bedding planes. Mudstone; grey, brown, silty, brown weathering, commonly carbonaceous, laminated, micaceous bedding planes. Sandstone - mudstone in fining upward cycles. Rare lenticular coal seams (<20 cm thick), and medium- to coarse-grained sandstone (quartzose, crossbedded, grey weathering). Relatively resistant marker unit with good topographic expression but usually poorly exposed*

MESOZOIC

LOWER AND UPPER CRETACEOUS

Ks — *SHAFTESBURY FORMATION: shale; dark grey, grey or rusty weathering. Red-brown weathering, laminated siltstone interbeds are common near top. Recessive, dark weathering unit*

LOWER CRETACEOUS

LUSCAR GROUP (Kc - Kg)

Kg — *GATES FORMATION: sandstone; fine to coarse grained, carbonaceous, cross-bedded, tan or red-brown weathering. Interbedded with carbonaceous shale; grey, brown; carbonaceous siltstone; grey, cross-laminated; coal; beds commonly over 1 m thick; and sandy pebble conglomerate; clast supported, in beds up to 5 m thick. Sandstone; fine grained, well sorted, resistant, brown weathering unit, 0 to 20 m thick, forms base of succession in many areas. Ribbed weathering unit*

KM — *MOOSEBAR FORMATION: shale; dark grey with ironstone concretions. Sandstone; grey, very fine grained, laminated, very thin to thin bedded, brown weathering, absent in lower part of unit, more common near the top. Recessive marker unit*

Kgl — *GLADSTONE FORMATION: sandstone; fine to coarse grained, carbonaceous, crossbedded, orange-brown weathering, and local sandy pebble conglomerate. Interbedded with carbonaceous siltstone, carbonaceous shale and minor coal. Plant remains abundant throughout. Ribbed weathering unit*

Kc — *CADOMIN FORMATION: conglomerate; pebble to cobble, clast supported in red-brown weathering sandy matrix. Local interbeds of sandstone and siltstone. Resistant, light grey weathering, or black lichen covered marker unit*

KCMo — *CADOMIN, GLADSTONE AND MOOSEBAR FORMATIONS, undivided. Subsurface only*

KL — *LUSCAR GROUP, undivided. Subsurface only*

Kgc — *MINNES GROUP (JKwr - Kgc)*

GORMAN CREEK FORMATION: interlayered sandstone, siltstone, mudstone, carbonaceous shale or coal in repetitive fining upward cycles generally 1 to 5 m thick. Sandstone; fine to coarse grained, carbonaceous, ripple cross-laminated or crossbedded, commonly rich in dark chert, locally conglomeratic, orange or brown weathering. Siltstone; grey; carbonaceous, orange or grey weathering. Shale; silty, carbonaceous, grey weathering, commonly grading to coal. An orange-brown weathering succession with few marker units; commonly complexly folded with minor faults

JURASSIC AND CRETACEOUS

UPPER JURASSIC AND LOWER CRETACEOUS

JKwr — *MONTEITH FORMATION: sandstone; very fine grained, light brown-grey, laminated, pinkish or light grey weathering with minor grey shale interbeds (lower part). Sandstone rich in dark chert. Shale and siltstone in the upper part. The lower part forms a resistant marker unit. Subsurface only*

JKFM — *FERNIE FORMATION AND MINNES GROUP, undivided. Subsurface only*

JURASSIC AND CRETACEOUS

UPPER JURASSIC AND LOWER CRETACEOUS

JKN — *NIKANASSIN FORMATION: sandstone; very fine-grained, orange-brown weathering. In thin to very thick beds, interbedded with minor dark grey shale, silty shale and argillaceous sandstone in the lower part. Interlayered sandstone, siltstone, mudstone, carbonaceous shale of the upper part is lithologically similar to Gorman Creek Formation. The lower part is resistant weathering; the upper part is a ribbed, generally orange weathering unit*

JKFN — *FERNIE AND NIKANASSIN FORMATIONS, undivided. Subsurface only*

JURASSIC

Jf — *FERNIE FORMATION, undivided: shale; grey, silty, brown weathering. Siltstone; brown-grey, very thin to thin bedded Sandstone; light grey, quartzose, well cemented, thin-bedded, orange-brown weathering in the upper part. Shale; dark grey; locally rusty weathering, ironstone concretions. Minor quartz sandstone and glauconitic sandstone near base of lower part. A few metres of interbedded black shale and dark limestone occurs at base (Nordegg Member). Recessive unit*

SUBSURFACE ONLY

TRIASSIC

Ts — *SPRAY RIVER GROUP: siltstone, shale, limestone, dolostone, sandstone and anhydrite*

CARBONIFEROUS AND PERMIAN

CP — *BANFF FORMATION, RUNDLE GROUP AND BELCOURT AND MOWICH FORMATIONS, undivided: limestone, shale, dolostone and minor sandstone*

DEVONIAN

UPPER DEVONIAN

Dp — *PALLISER FORMATION: limestone; brown-grey, wavy bedded to thodular, dolomitic and burrow mottled*

Dfa — *FAIRHOLME GROUP: limestone, dolostone, argillaceous limestone and shale*

Df — *FLUME FORMATION: limestone, shale*

PALEOZOIC

CAMBRIAN

MIDDLE AND UPPER CAMBRIAN

muC — *Limestone, dolostone and shale*

LOWER CAMBRIAN

Cg — *GOG GROUP: quartz sandstone*

Dwa — *WABAMUN FORMATION: limestone*

Dw — *WOODBEND GROUP: limestone, dolostone, shale, argillaceous limestone*

DEB — *ELK POINT AND BEAVERHILL LAKE GROUPS, undivided: limestone, dolostone, evaporites and sandstone*

Outcrop examined, bedding attitude not determined; approximate orientation of bedding in shallow dipping crossbedded sandstone

Geological boundary (defined, approximate, assumed)

Geological boundary (assumed projection under cover of younger deposits)

Bedding, tops known (horizontal, inclined, vertical, overturned)

Bedding, tops unknown (inclined)

Detachment surface for landslide and slumped blocks (approximate, assumed)

Fault, thrust or reverse, west vergent (teeth indicate upthrust side; defined, approximate, assumed)

Fault, thrust or reverse, west vergent (assumed projection under cover of younger deposits)

Fault, thrust or reverse, east vergent (teeth indicate upthrust side; defined, approximate, assumed)

Fault, thrust or reverse, east vergent (assumed projection under cover of younger deposits)

Anticline, trace of axial plane (fold upright, overturned; defined, approximate, assumed; arrow indicates direction of plunge)

Syncline, trace of axial plane (fold upright, overturned; defined, approximate, assumed; arrow indicates direction of plunge)

Anticline and syncline (assumed projection under cover of younger deposits)

Monocline (arrow indicates dip direction of steeper limb; approximate)

Diagrammatic profiles of sets of minor folds (30 to 10 mrevlength) viewed to the northwest. Axial trace indicates the observed extent of the structures

Minor folds; axis, trend and plunge (± fold, ± fold)

Lateral change in lithofacies (denoted by zig-zag perpendicular to map unit contacts)

Change in mapping precision; stratigraphic subdivisions are amalgamated at dotted line

Line of section — 6 — 6

Limit of coal mine

Well (gas, abandoned)

Geological interpretation by M.E. McMechan, 1989, 1994; based on ground and air observations by M.E. McMechan (1981-83, 1985, 1990), airphoto and seismic interpretation, GSC Map 1041 for Copton Creek map area (Irish, 1954) and Alberta Research Council Geological Map, Grande Cache area, Alberta (Langenberg and Wrightston, 1996) for Smoky River coal mine area.

SCHEDULE OF WELLS

1. *Amoco Grande Cache 11-21-59-8W6*
2. *Aquitaine Copton 15-23-59-9W6*
3. *Winter A-1 Caw Creek 13-35-58-10W6*
4. *Mobil Gulf Shell Copton 14-23-60-8W6*
5. *Seafort Prairie Creek 11-32-60-6W6*
6. *TP et al Copton 3-10-60-10W6*

Digital cartography by P.R.J. Wozniak, Geological Survey of Canada (Calgary)

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

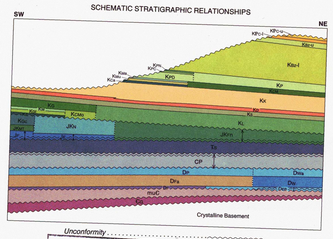
Digital base map at the scale of 1:50 000 from Geomatics Canada, Natural Resources Canada, modified for publication by the Geological Survey of Canada

Copies of the topographical edition covering this map area may be obtained from the Canada Map Office, Natural Resources Canada, Ottawa, Ontario, K1A 0E9

Approximate magnetic declination 1996, 21°58' East, decreasing 8.8' annually

Elevations in feet above mean sea level

SCHEMATIC STRATIGRAPHIC RELATIONSHIPS



Recommended citation:
McMechan, M.E.
1996: Geology and structure cross-section, Copton Creek, Alberta; Geological Survey of Canada, Map 1903A, scale 1:50 000